

## Design, Validation and Application of the Affective Domain Development Questionnaire for Generic Competencies in Chilean Higher Education Students

### Diseño, validación y aplicación del cuestionario de desarrollo de la dimensión afectiva de competencias genéricas en estudiantes universitarios chilenos

María-Gracia González Navarro, Gracia Navarro Saldaña y Marcela Varas Contreras

Universidad de Concepción

#### Abstract

From the conceptualization of generic competencies as a knowledge system composed by three domains —cognitive, affective and behavioural— not dependent on a particular disciplinary area but all graduates should develop them and be able to use them in different contexts, this study aims to construct and validate a self-report instrument to assess two aspects of the affective domain of generic competencies: the importance given toward development of generic competencies during the university and the positive disposition towards this training, expressed by concrete actions. The sample is composed by 194 students from a Chilean university and the procedure of construction, validation and application has six stages. Results show that the questionnaire constructed is valid and consistent to assess the affective domain of generic competencies in higher education students and significant differences were found in the development of the affective domain when compared between genders (women show higher development) and disciplinary areas (students from the chemical-biological area show higher development).

**Keywords:** Krathwohl's taxonomy, affective domain, generic competencies, higher education students

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#### Post to:

Email: [mgonzalez@udec.cl](mailto:mgonzalez@udec.cl), [gnavarro@udec.cl](mailto:gnavarro@udec.cl), [mvaras@udec.cl](mailto:mvaras@udec.cl)  
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## Resumen

A partir de la conceptualización de las competencias genéricas como un sistema de conocimientos integrados por tres dimensiones —cognitiva, afectiva y conductual— que no dependen de una disciplina en particular, sino que todos los egresados deberían desarrollarlas independiente del programa de estudios que cursen y que son transferibles a diferentes contextos, el presente estudio tiene como objetivo construir y validar un instrumento de auto-reporte que permita medir dos aspectos de la dimensión afectiva de las competencias genéricas: el valor entregado al desarrollo de las competencias genéricas en la formación profesional y la disposición positiva hacia esta formación, expresada a través de acciones concretas. Se utiliza una muestra de 194 estudiantes universitarios chilenos y un procedimiento que considera seis etapas en la construcción, validación y aplicación del instrumento. De los resultados, se concluye que el instrumento desarrollado es válido y confiable para ser usado en estudiantes universitarios, para evaluar la dimensión afectiva de las competencias genéricas y que existen diferencias significativas en el nivel de desarrollo de la dimensión afectiva en la comparación por sexo (más alto en mujeres) y área disciplinar (más alto en el área químico-biológico).

**Palabras clave:** taxonomía de Krathwohl, dimensión afectiva, competencias genéricas, universitarios

A few decades ago, it was suggested that the university has a social mission that is implemented by helping to educate skilled professionals to contribute to the development of society. In this context, in addition to education in a particular subject, we also discuss the relevance of training professionals whose decisions also consider the impact of their actions or omissions in the social sphere. Some institutions have thus opted to include training in generic competencies (GC) in their educational model with the aim of preparing future professionals to better respond to the demands of the environment.

Universities in different parts of the world have chosen to incorporate generic competencies into their education, selecting those that fit their curriculum, mission, and vision. In the case of Universidad de Concepción (UDEC), it seeks to contribute to society by training four generic competencies: social responsibility, critical thinking, communication, and entrepreneurship and interdisciplinary teamwork. For this purpose, since 2003 it has implemented an educational model to train university students in social responsibility and, in 2013, the model was transferred to the training of other GCs. The model proposes integrated training in the four aforementioned competencies and in their three dimensions: cognitive, affective, and behavioral, by means of an emphasis on each of those three dimensions throughout the curricula.

Development of the affective dimension of the competencies is essential, as it allows more profound learning of these competencies, which is reflected in behavioral change. Therefore, for all the institutions that have opted for profiles of competencies, it is of fundamental importance to have a process of education and assessment for the development of the affective domain of these competencies. This study outlines the creation of an instrument to measure the affective dimension of generic competencies, which we hope will be a contribution in terms of the conceptualization of this dimension, as well as the training of competencies in itself.

The objective of this study is to construct, validate, and apply a self-report instrument that allows measurement of the two areas of the affective dimension of generic competencies: the importance given to the development of generic competencies in professional training and positive disposition towards this training, measured through specific actions.

We describe the theory that underlies the instrument, its creation and validation, and the results obtained from a study of 194 university students.

## Literature Review

### Generic competencies and educational model of the Universidad de Concepción to train them

Generic competencies correspond to a system of knowledge formed by three dimensions: cognitive, affective, and behavioral (Navarro, Vaccarezza, González, & Catalán, 2015a), which do not depend on any particular subject, but rather all students should possess them notwithstanding their course of study (Hager, Holland, & Beckett, 2002). They can be transferred to different contexts (Gilbert, Balatti, Turner, & Whitehouse, 2004), that is, a competent student could use this knowledge in the classroom, but also in situations related to their personal and/or working life.

Being aware of the social inequalities in Chile, the changes entailed by globalization, and therefore, the requirements and needs of current society, the Universidad de Concepción de Chile has decided to cross train its students in four generic competencies: critical thinking, communication, entrepreneurship and interdisciplinary teamwork, and social responsibility. These are developed using a mixed curriculum at the institution and all graduates are expected to integrate them into their performance. In this way, the educational model considers the development of a professional of excellence, not only in a particular subject, but also in the personal and social aspect; a person who is capable of responding effectively to the new demands of society and contributing to its development (Navarro et al., 2015a).

On the one hand, the mixed curriculum that is implemented includes curricular adaptations throughout the courses, and on the other, the offer of complementary and voluntary subjects and in small interdisciplinary groups, in which students are expected to be able to extend their learning in each of the four generic competencies trained. The UDEC's undergraduate curricula last for between five and seven years before a professional qualification is granted and they are organized in three educational program cycles (Basic, Bachelor, and Professional). The four generic competencies are trained in each of them, with the main emphasis on their three dimensions: cognitive, affective, or behavioral. Therefore, in the Basic cycle, the emphasis is placed on the development of the cognitive dimension of the generic competencies; in the Bachelor cycle the stress is on the affective dimension, and, finally, in the Professional cycle, it is on the behavioral dimension (Navarro et al., 2015a).

### Affective dimension of learning

Practical experience during the development of this educational model has shown the relevance of the affective dimension of generic competencies. This is consistent with the points raised by Ghaemi (2012), in terms of the fact that, in a focus on competencies, the variables that measure learning are essential, with the affective dimension being one of them. Although there is clarity about the importance of this dimension in learning, it tends to receive less attention because this learning is difficult to operationalize (Ghaemi, 2012), difficult to measure (Housley Gaffney, & Dannels, 2015), and difficult to develop (Hall, 2011).

The UDEC educational model understands the development of the affective dimension to be the affective learning of generic competencies, which is understood as an individual's positive disposition toward a particular subject matter, which changes their operational framework and value system, thus guiding decision-making and behavioral choices in all aspects of life (Thweatt & Wrench, 2015). Therefore, the development of the affective dimension is essential for training generic competencies in students, since only insofar as they value and consider their development important in these areas will there be interest and effective effort to develop behavior that is consistent with learning (Buissink-Smith, Mann, & Shephard, 2011) and, thus, critical thinking, competent communication, skills to undertake an enterprise and work in an interdisciplinary team, and perform professionally in a socially responsible manner. As Stiggins (2005) states, desire and motivation represent the foundation of learning. If students are not interested in learning or do not give it importance, it is difficult for them to carry out actions to do so successfully.

Although the affective dimension may be implicit in the curriculum in higher education, it is rarely mentioned explicitly in curricula (Beard, Clegg, & Smith, 2007). The educational model presented here is aimed at focusing these educational processes, incorporating learning outcomes and pedagogical practices that are especially directed at the affective dimension of generic competencies.

Krathwohl, Bloom, and Masia (1964) suggest a taxonomy for the development of the affective dimension that facilitates its operationalization, integration, and measurement in the educational system. The authors understand this dimension as a process of internalization of values that can be described in a continuum of five progressive levels (Myers & Goodboy, 2015). The five levels proposed by Krathwohl et al. (1964) range from reception to characterization by a certain value. The first level is “Reception” and it is related to the willingness of students to focus their attention on a subject. The second level is “Response” and implies that students react to a subject and feel satisfaction when doing so. The third level is “Valuation” and corresponds to acceptance and preference for a value. The fourth level of the taxonomy is “Organization”, which corresponds to the conceptualization and internalization of a system of values. Finally, the fifth level of the taxonomy is “Characterization”, which corresponds to a lifestyle that is consistent with the system of values. This taxonomy thus responds to what has been stated by various authors about the difficulty of being objective regarding this dimension (Ghaemi, 2012, Hall, 2011, Housley Gaffney, & Dannels, 2015, Shephard, 2008), establishing observable behaviors related to the development of the affective dimension and each of the levels of the taxonomy. The educational model of the Universidad de Concepción for training generic competencies has used this taxonomy to establish learning outcomes and expected indicators at the different levels of development, recognizing that progress between these levels is not automatic, but instead requires focused pedagogical strategies to be achieved and is a long-term process.

### **Measurement of the affective dimension**

From the moment that the objective is the development of the affective dimension of learning, it is necessary to measure it. Buissink-Smith et al. (2011) suggest that the assessment of this aspect contributes to the monitoring of students’ learning, in determining the impact of interventions that seek to develop this dimension and deepen understanding of the relationship that exists between the affective dimension of learning and the behavior itself. In relation to this, it is proposed that the assessment should be a process and not summative (Popham, 2011), which includes a pre- and posttest that allow the effects of the intervention to be recognized (Myers & Goodboy, 2015), as well as carrying out regular assessment processes that allow decision-making and adjustment of the intervention if necessary (Popham, 2011). Some of the suggested methods to assess this dimension are scales of self-evaluation, interviews, mapping, observation, or co-evaluation (Buissink-Smith, Mann, & Shephard, 2011).

### **Research Problem**

Insofar as the competencies are considered as a knowledge system comprised by three-dimensions; cognitive, affective, and behavioral, it is necessary to make the training of each of those dimensions intentional and explicit. Therefore, institutions that are willing to incorporate these elements into their curricula must have teaching and assessment strategies for each of them. In addition to knowing the value given to the development of generic competencies (the study objective in various research projects, such as Navarro, González, Pérez, & Varas, 2015b; Leggett, Kinnear, Boyce, & Bennett, 2004; Medina Palomera, Amado Moreno, & Brito Páez, 2010; Vera Noriega, Estévez Ménniger, & Ayón Munguía, 2010), it is essential to recognize the willingness of students to perform behaviors that are consistent with that value and thus predict behaviors and make decisions about the pedagogical program for their education.

Within the framework of this interest and the need for assessment instruments to measure the integration of generic competencies in the education of university students (from the Basic cycle to the Professional cycle), during 2015, a pilot questionnaire was applied at the Universidad de Concepción to evaluate the development of the affective dimension of generic competencies in students (Navarro, González, Pérez, & Varas, 2015b).

The instrument was comprised by 27 items, which measured the degree of importance assigned through a Likert-type scale from 1 to 7, where 1 corresponds to “*It does not contribute to my education and subsequent professional performance*” and 7 “*It is essential to my education, my future professional performance and the development of society as a whole.*” Likert-type rating scales are suggested to measure attitudes due to their high level of reliability and validity, as well their simple administration and assessment, and

because they allow the operationalization of abstract constructs through the assertions in the items and self-reporting by the respondents (Neligia, 2001).

The instrument was applied online to 858 students and their psychometric analysis showed relevance and reliability when measuring the value that students attributed to the comprehensive education provided by the university, without making a difference between the values given to each of the four generic competencies that are trained at the institution. However, the instrument does not allow the identification of students' willingness to develop behaviors that allow them to be trained in generic competencies or which are consistent with the importance they give to their education, an element that is fundamental in understanding the affective dimension based on the taxonomy proposed by Krathwohl et al. (1964). Therefore, based on the need to take decisions for the implementation of the curriculum in the institution and contribute to the field of research in this area, it is proposed that an instrument be created that allows discrimination between the value given to the generic competencies and the willingness to perform behaviors to achieve their development.

## Methodology

### Participants

We used a non-probabilistic sample of 194 students from the Universidad de Concepción enrolled in one of the 20 complementary subjects offered by the Study Program on Social Responsibility (PERS) to complement the training in generic competencies. Of these students, 100 were male (51.5%) and 94 were female (48.5%). Table 1 shows the distribution of the sample by subject area, degree program cycle, and gender. The separation by subject area corresponds to a categorization carried out in 2003 by six Chilean universities participating in the project MECESUP UCO0303 for training Social Responsibility, and which is still used at the Universidad de Concepción to carry out research on this subject.

Table 1  
*Distribution of the sample by subject area, degree cycle and gender.*

Degree Cycle	Sex	Subject Area			Total
		Physics-Mathematics Area	Chemistry-Biology Area	Social-Humanist Area	
Basic Cycle	Male	35	8	4	47
	Female	18	14	13	45
Bachelor Cycle	Male	26	10	2	38
	Female	5	14	22	41
Professional Cycle	Male	10	1	4	15
	Female	4	4	0	8
Total		98	51	45	194

NB: Examples of degrees included by subject area: e.g. PM: computer engineering and astronomy; E.g. CB: medicine and biochemistry; E.g. SH: psychology and law.

### Procedure

Design of the instrument began with the analysis of the strengths, weaknesses, and suggestions generated from the assessment scale created in 2015 to evaluate the affective dimension of the generic competencies. Based on this and considering specialized literature on the subject, six stages were carried out, the sixth being analysis of the results obtained in the final application of the instrument.

**Survey of university students.** This was conducted to find out about specific behaviors that could be carried out during the university degree course and which demonstrate value and positive disposition towards the formation of generic competencies. A survey was conducted of 200 university students enrolled in the 20 complementary subjects offered by the Study Program on Social Responsibility (PERS) at the Universidad de Concepción. These subjects are intended to complement the training in generic competencies of the university students. They are offered to students studying all degrees and they enroll from all the different years. The survey was sent by email during November 2015 and it consisted of an introduction to the generic competencies plus two questions:

Through what specific actions performed by a student would you recognize that he or she considers it important to develop generic competencies for their future professional performance? E.g. talking about the importance of generic competencies for their professional future.

Through what actions performed by a student would you realize that he or she is willing to work to develop generic competencies during their time at university? E.g. they enroll in complementary courses that serve to develop generic competencies.

Responses were obtained from 42 students, which were analyzed qualitatively, generating categories which were used to base the development of the items in the instrument.

**Instrument design:** Considering the categories generated based on the analysis of student responses and specialized literature, 15 progressive items were drafted in accordance with the five levels of behavior that the taxonomy proposed by Krathwohl et al. (1964) indicates as being expected according to the level of affective mastery achieved. The items are written in affirmative form and the responses in degree of agreement/disagreement in the Likert format, with five increasing levels: 1: strongly disagree; 2: disagree; 3: neither disagree nor agree; 4: agree; 5: strongly agree. Once the items were constructed, they were validated by the team of five professionals in charge of training generic competencies at the university. Table 2 shows examples of the items categorized according to the level of the corresponding Taxonomy.

Table 2  
*Items categorized according to Taxonomy of Krathwohl (et al. 1964)*

Levels	Examples of items
First level: Reception	<i>I understand what the generic competencies trained at the university are and what they consist of.</i>
Second level: Response	<i>I do work or carry out tasks that serve to develop generic competencies.</i>
Third level: Valuation	<i>I am willing to invest time and energy to promote my development in generic competencies (research the subject, seek out reading, attend seminars or talks on the subject, participate in projects on the subject, etc.).</i>
Fourth level: Organization	<i>I try to ensure that my professional behavior is consistent with the four generic competencies that are trained at the University.</i>
Fifth level: Characterization	<i>Those around me could say that I am a person who believes that generic competencies are important for professional development.</i>

**Pilot application.** It was applied in March 2015 to university students. The process was carried out in the building of the Study Program on Social Responsibility during registration for complementary subjects. During March a large number of students attended from different degree courses and who were interested in the offer of complementary subjects under the PERS. For five days in March an evaluator was located in the building, who requested informed consent from the students to participate by answering the questionnaire and some questions regarding their understanding of the items. Based on the students' comments, the presentation of the instrument and certain words were modified.

**Application of the instrument.** The final instrument was applied to 200 students who were accepted as regular students on one of the 20 complementary courses offered by the PERS and who gave their informed consent to participate. The assessment was carried out as part of the diagnosis of the subjects,

with only those instruments with complete answers considered for the analysis under the suggested criteria to perform factor analysis. A total of 194 valid questionnaires were thus obtained for analysis.

**Psychometric analysis of the instrument.** The IBM SPSS Statistics 21 statistical package was used to analyze the validity and reliability of the instrument. The psychometric analysis of the instrument involved two stages: 1) the factorial structure of the instrument, through exploratory factor analysis (EFA) with the Principal Axis Factoring extraction method. Beavers et al. (2013) suggest that this test be used when there is no normal distribution in the sample, which was ruled out in this analysis based on the result of the Kolmogorov-Smirnov Test ( $<0.005$ ). Finally, oblique rotation was used, which is a method suggested when it is presumed that there are factors underlying the observed reactions and factors that could be related, which usually happens in Social Sciences (Beavers et al., 2013). 2) Evaluation of the internal consistency of the instruments by means of the calculation of Cronbach's Alpha reliability coefficient.

**Analysis of results.** The development level of the affective dimension is interpreted based on the students' responses to the statements in the instrument. As mentioned, the statements were constructed based on a bibliographic review, expert judgment, and the perception of university students about expected behaviors in people who have developed the affective dimension of generic competencies. Therefore, the degree of further development corresponds to the largest number of answers that indicate the maximum level in accordance with the statements (5: *strongly agree*). Based on that, the maximum level of development in the questionnaire was defined as 75 points and the minimum level as 14 points (corresponding to total disagreement on all items). For this application, four levels of development were established based on the possible responses. Responses in disagreement with the statements are considered to be a *low* level of development (15 to 28 points). Responses in which there may be agreement or disagreement are considered a *moderate* level (29 to 45 points). Responses in which there is a degree of agreement with the statements are an *adequate* level (46 to 60 points), and responses in which there is mainly a high level of agreement with the statements are considered a *high* level (61 to 75 points).

The hypotheses proposed for this process were as follows:

**H1:** The students possess an adequate level of development of the affective dimension of the generic competencies.

Studies carried out previously in the Universidad de Concepción to assess values and attitudes (Navarro et al., 2012) and the affective dimension of the generic competencies show that importance is given to their development (Navarro et al., 2015b), so, considering maintaining actions to develop this aspect, the level of development of the affective dimension is expected to be adequate.

**H2:** The level of development of the affective dimension is similar in men and women.

The educational model of the institution in which this study is carried out is framed around the search for common wellbeing and interdependence (Universidad de Concepción, 2014). It is based on this option that it has chosen to train four defined generic competencies. However, each of them is framed within the search for the common good (Navarro et al., 2015). As Navarro (2012) states, there is no difference between men and women in these values, so it would be expected that when they are at the base level for training generic competencies, there should be no difference in the value they attribute to it to for developing better professional training either.

**H3:** The level of development of the affective dimension of the generic competencies is greater in students of degrees in the Social-Humanist area.

As mentioned in the previous hypothesis, the development of generic competencies at the university in which this study was carried out is related to the pursuit of the common good and interdependence. Therefore, it would be expected that students whose studies focus on the analysis of society and the development of people and communities will give greater value to professional development that complements education in a subject with the generic competencies than students whose studies have a more specific focus that is not always directly related to other people.

**H4:** The level of development of the affective dimension of the generic competencies is greater in students who have advanced to the professional cycle.

As suggested by Nordenflycht (2011), one fundamental property of the competencies is transferability and requirement for a specific context to be performed. Therefore, it would be expected that students that are already studying in the professional cycle, that is, they are already immersed and have detailed knowledge of the context of the future labor field, ascribe more value to the importance of incorporating generic competencies in their professional performance than students who recently entered the institution and who do not have specific knowledge of the requirements of their future workplaces and functions will be and, therefore, the importance of transferring generic competencies to them.

## Results

### Psychometric analysis of the instrument

Evaluation of the relevance of the factorial analysis using the Kaiser-Meyer-Olkin test and Bartlett's sphericity test was  $KMO: 0.844$  and  $X^2 = 745.403$ ;  $p < .000$ , meeting the conditions needed to carry out an exploratory factorial analysis (Beavers et al., 2013). According to the Kaiser-Guttman rule, three factors were extracted with eigenvalues  $>1$  (4.718; 1.521; 1.143). To complement the factor extraction decision, first Cattell's Scree Test was done (Beavers et al., 2013; Costello & Osborne, 2005; Morales, 2015), which, as can be observed in Figure 1, showed a clear relevance of two factors and a third that was open to interpretation. To determine the final factorial solution, a parallel analysis (Horn, 1965) was performed based on 2000 random samples, in which two factors were identified with higher eigenvalues (4.718; 1.521) than those obtained in the 95th percentile of the simulation with random values (1.496; 1.376), suggesting a final bifactorial structure.

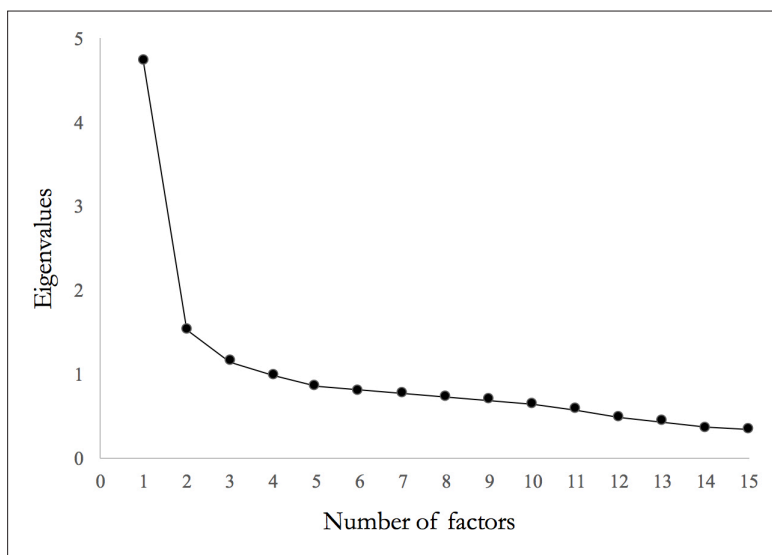


Figure 1. Cattell's Scree Test

This solution produced an item with a value lower than 0.30 (0.283; item af11: *When judging how a professional in my area works, I consider the way in which they act according to generic competencies*), a value that is considered to be adequate to establish the significant relevance of an item to a given factor, so we proceeded to eliminate it (Beavers et al., 2013; Hair et al., 2005). The final factorial structure of the instrument is shown in Table 3, which was comprised by two factors: *Factor 1: Favorable disposition towards the development of generic competencies* and *Factor 2: Self-attribution of favorable behaviors for the development of generic competencies*. The value of the Pearson correlation coefficient is 0.523,  $<0.000$ .



Finally, the consistency evaluation of the instrument produced a Cronbach Alpha of  $\alpha = 0.823$ , showing that the instrument is adequate, while for Factor 1  $\alpha = 0.791$  and for Factor 2  $\alpha = 0.691$ .

Table 3  
*Factorial configuration matrix with Principal Axis Factoring extraction method and Promax rotation*

Items	F1	F2
<i>Af1</i> I think it is necessary to integrate aspects related to the generic competencies into the university education I receive.	0.883	
<i>Af2</i> I understand what the generic competencies trained at the University are and what they consist of.		0.580
<i>Af3</i> I am familiar with the opportunities offered by the university to develop generic competencies.		0.565
<i>Af4</i> I do work or carry out tasks that serve to develop generic competencies.		0.386
<i>Af5</i> I enjoy learning about things related to the training of generic competencies.	0.663	
<i>Af6</i> I pay attention when the University (in complementary courses, on the degree course, in the faculty, etc.) speaks about things related to training of generic competencies.	0.338	
<i>Af7</i> I seek activities that are complementary to my career that allow me to develop the four generic competencies (complementary courses, extra-curricular activities, volunteering, etc.).		0.453
<i>Af8</i> I am willing to invest time and energy to promote my development in generic competencies (research the subject, seek out reading, attend seminars or talks on the subject, participate in projects on the subject, etc.).	0.482	
<i>Af9</i> I believe that in order to improve Chilean society, we students should be concerned about developing generic competencies.	0.625	
<i>Af10</i> In my performance, I usually opt for those decisions that are aimed at the common good (mine, that of other people with whom I work, and society in general).	0.425	
<i>Af12</i> I try to ensure that my professional behavior is consistent with the four generic competencies that are trained at the University.		0.474
<i>Af13</i> I am concerned about contributing to the development of the generic competencies of those around me.	0.383	
<i>Af14</i> When I realize that I have not acted consistently with the generic competencies, I look for ways to improve my performance next time.	0.399	
<i>Af15</i> Those around me could say that I am a person who believes that generic competencies are important for professional development.		0.541

### Development of the affective dimension of the students assessed

Some 54% of the 194 students assessed have a High level of development of the affective dimension of the generic competencies, 44% have an Adequate level of development, and 4% have a Moderate level. There are no students classed as having a Low level of development.

The measurements obtained from the responses of the students were used to make the comparison of results by gender, subject area, and degree cycle. Table 4 shows the results by gender based on a comparison of measurements made with the Student T test. The women obtained higher scores in the overall instrument, on Factor 1: *Favorable disposition towards the development of generic competencies*, on

Factor 2: *Self-attribution of favorable behaviors for the development of generic competencies*, and in 13 of the 14 items measured. The difference is significant for the overall result, factor 1, factor 2, and items af1, af4, and af7. Only in item af15, *Those around me could say that I am a person who believes that generic competencies are important for professional development*, was the same result obtained for both groups.

Table 4  
Comparison of measurements by Gender with Student T test for independent samples.

	Mean Men	Mean Women	t	gl	Sig. (bilateral)	Difference of means	Standard Error of difference	95% confidence interval for difference	
Global	3.91	4.07	-2.633	189.836	0.009	-0.169	0.064	-0.295	-0.042
F1	4.11	4.25	-2.154	185.227	0.033	-0.149	0.069	-0.285	-0.013
F2	3.64	3.84	-2.447	191.827	0.015	-0.195	0.079	-0.353	-0.038
Af1	4.39	4.62	-2.256	181.441	0.025	-0.227	0.101	-0.426	-0.028
Af2	3.64	3.72	-0.622	191.798	0.535	-0.083	0.134	-0.348	0.181
Af3	3.06	3.15	-0.579	191.350	0.563	-0.089	0.154	-0.392	0.214
Af4	3.97	4.30	-2.940	191.412	0.004	-0.328	0.112	-0.548	-0.108
Af5	3.93	4.13	-1.724	191.914	0.086	-0.198	0.115	-0.424	0.029
Af6	3.97	4.00	-0.258	191.390	0.797	-0.030	0.116	-0.260	0.200
Af7	3.32	3.79	-3.367	191.866	0.001	-0.467	0.139	-0.741	-0.194
Af8	4.03	4.22	-1.790	191.904	0.075	-0.193	0.108	-0.407	0.020
Af9	4.40	4.59	-1.868	184.340	0.063	-0.185	0.099	-0.381	0.010
Af10	4.37	4.52	-1.464	186.826	0.145	-0.151	0.103	-0.355	0.053
Af12	4.06	4.27	-1.881	191.989	0.061	-0.206	0.109	-0.422	0.010
Af13	3.63	3.78	-1.250	190.053	0.213	-0.147	0.117	-0.378	0.085
Af14	4.10	4.16	-0.516	186.742	0.606	-0.060	0.115	-0.287	0.168
Af15	3.80	3.80	0.019	186.705	0.985	0.002	0.114	-0.224	0.228

NB: does not assume equal variances

Table 5 shows the results obtained by comparing the development of the affective dimension between students on degree courses in the three subject areas. By comparing the overall result, the highest mean is obtained by students in the chemistry-biology area (4.20), followed by those in the social-humanist area (4.08), and in third place those in the physics-mathematics area (3.83). In the case of Factor 1 of the instrument, there are significant differences between the subject areas, with the highest mean obtained by students in the CB area (4.35), followed by those in the SH area (4.25), and then those in the PM area (4.05). For Factor 2 there are significant differences between the students in the three subject areas and the behavior is similar, with the highest mean obtained by students in the CB area (4.01), followed by those in the SH area (3.86), and finally the PM area (3.54).

Table 5  
*Comparison of means by Subject Area with ANOVA of a factor*

		Sum of squares	gl	Quadratic average	F	Sig.
Global	Inter-group	5.113	2	2.557	14.003	0.000
	Intra-group	34.873	191	0.183		
	Total	39.986	193			
F1	Inter-group	3.258	2	1.629	7.238	0.001
	Intra-group	42.992	191	0.225		
	Total	46.250	193			
F2	Inter-group	8.267	2	4.134	14.920	0.000
	Intra-group	52.919	191	0.277		
	Total	61.186	193			

When comparing the results between students in the three degree program cycles, no significant differences were found in the means obtained in the overall, in Factor 1, and in Factor 2. Similar results were obtained in the three comparisons. The highest mean was for students in the Professional cycle, followed by students in the Bachelor cycle, with the lowest mean for students in the Basic cycle. The only significant difference observed was in the means obtained by the three groups for item Af9 “*I believe that in order to improve Chilean society, we students should be concerned about developing generic competencies*” ( $F(2,191)=5.932$ ;  $p<0.05$ ). The highest mean was obtained by the group in the Professional cycle (4.87), followed by the group in the Basic cycle (4.53), and the group in the Bachelor cycle (4.33). The post hoc tests of the analysis for item Af9 show that the differences between the Professional cycle and the other two cycles are significant and that this is not the case for the difference in means between the Bachelor cycle and the Basic cycle.

Finally, a comparison was made of the means obtained in Factor 1 and Factor 2 by means of the Student T test for related samples. The analysis was conducted for each group used in this study: gender (males, females), subject area (PM; CB; SH), and degree stage (basic; bachelor; professional cycle) and in all of them it was observed that the mean of factor 1, *Favorable disposition toward the development of generic competencies*, is significantly greater ( $p < 0.005$ ) than the mean obtained in factor 2, *Self-attribution of favorable behaviors for the development of generic competencies*.

## Discussion

The method used in the process of creating the instrument allowed behaviors to be identified which, in the university context, reflect the value in and disposition toward the development of generic competencies; on the other hand, the use of the taxonomy of Krathwohl et al. (1964) as a theoretical framework facilitated the creation of items that represent all their levels and, therefore, the progressive development of the affective dimension proposed by the authors. In this way, the items designed take into account beliefs and actions on which the individuals must indicate the degree to which they agree or disagree, and it is assumed that the level of development of the affective dimension is greater when more of those behaviors are practiced (greater number of items with which they agree) and to a higher degree (more times they “strongly agree”).

The psychometric analysis of the instrument showed a bifactorial structure: Factor 1 *Favorable disposition toward the development of generic competencies*, which comprises items that reflect the importance and interest in professional training that includes generic competencies, and Factor 2 *Self-attribution of favorable behaviors for the development of generic competencies*, which reflects the option for behaviors that are consistent with the value given to the development of generic competencies. The disposition toward and importance of a certain value or content is an indicator of behaviors consistent with the same value (Goleman, 1998), a fundamental idea during the taking of pedagogical decisions for the development

of the affective dimension. The questionnaire constructed reflects this relationship between value and behavior through a significant relationship between both factors. On the other hand, when analysing the results, factor 1 (Disposition) turned out to be significantly greater than factor 2 (Self-attribution of behaviours) in all comparisons of the means, which is consistent with the theoretical model proposed by Krathwohl et al. (1964): in the developmental continuum of the affective dimension, the highest levels imply changes in behaviour and, at the same time, are inclusive of the lowest, which are necessary to achieve the most complex levels and are linked to attention, value, or disposition.

The instrument turned out to be valid and reliable when used with students of Universidad de Concepción and the methodology used in its construction was found to be suitable to operationalize abstract and recent constructs in the institution. It is important to bear in mind that use of the questionnaire implies knowledge of the concept “Generic Competencies”, so its use must take this aspect into account. In the case of this study, the instrument was used with students who sign up for complementary subjects for the development of the GC and it also included an explanation of the instrument to ensure that the students fully understood what it was about. On the other hand, the items take into account behaviors contextualized in the daily life of this institution, so when using this instrument elsewhere, it is suggested that one check whether the institution at which it will be applied offers the same opportunities and conditions that this questionnaire measures.

Regarding the results obtained from application of the instrument, it was observed that the students assessed have an adequate level of development of the affective dimension. This result may be linked with the sample used in this study: students from different degree courses and levels who are all interested in signing up for complementary courses to develop generic competencies. Even in the case of students who sign up for these modules to obtain credits needed to graduate, based on the experience of the lecturers who teach these subjects, the large majority show interest in using the classes to complement their training. Regarding this aspect, we have not yet applied the instrument to a larger and more representative sample of university students.

The analysis of the results was conducted taking into account gender, subject area, and the stage of the degree course. Generally, experiences in the area of development of generic competencies in higher education institutions are the same for both sexes. However, given that, in this case, the proposed education model frames the development of generic competencies as a tool in the promotion of the common good and that the development of principles and values is also linked to the gender role, we decided to explore that this difference. It was found that women have higher point scores in all of the items studied, which could be related to the results of Navarro et al. (2012), who, when measuring the values and attitudes of 2,867 Chilean university students, found that women attach greater importance to values such as “sociability, solidarity for coexistence”, “interdependence”, “integrity”, “common good and equality”, and “sustainable development,” values that could be considered fundamental in the interest in developing generic competencies. It would be expected that the degree to which women attach greater importance to those values than men correlates with the degree to which they express more interest in, and assign more value to developing generic competencies than their male counterparts do. In the same study (Navarro et al., 2012) it was found that students on degree course programs in the social-humanist subject area attach greater importance to those values, which was linked to the fact that in those subjects the students have earlier exposure to other people and that the methods used favor the adoption of an outlook based on social and moral development, and, therefore, given the similarities with the aspects measured in this study, similar results were expected. However, it was found that the students in the chemistry-biology area demonstrate the greatest level of development in this dimension. This difference could be due to the fact the educational model for the development of generic competencies has been employed more in degree programs in the social-humanist area. Nevertheless, a control group should be considered to further explore this hypothesis. The aim of this study was not to make comparisons between students exposed to the model and those who are not, and thus no comparisons were made. However, it is recommended that this be done to obtain a greater understanding of the phenomenon.

Regarding the differences by degree cycle, as was expected, students in the Professional cycle exhibited the greatest development of the affective dimension. These results are consistent with what was found by Leggett et al. (2004) in Australian students who, as they progress through their degree programs, attached greater importance to generic competencies. In their study, the generic competencies to which greatest value was attached as the degree program progressed were those considered necessary to develop

sufficiently in accordance with the requirements of the program and those to which professors frequently attached importance. In the case of the results presented here, it is thought that students in the final cycle could be attaching greater importance to the development of generic competencies owing to their exposure to the labor field during professional placements or internships. This assumption echoes what Clemente-Ricolfe and Escribá-Pérez (2013) found among Spanish students: students who have had the opportunity to work attach greater importance to generic competencies than students who have not. However, the argument of Leggett et al. (2004) is an important assumption for the development of the educational model of Universidad de Concepción, because it can be expected that, as the teaching and evaluation methods used in the programs require the use of the four formed generic competencies for a successful performance, and academics declare their importance (both currently elements that are currently considered in the educational model), development of the affective dimension will continue to be promoted.

Finally, if the aim is continuous improvement in the opportunities offered by the university to students for the development of generic competencies, given the relevance of the affective dimension in the achievement of meaningful learning, it is necessary to be aware of the level of development before making pedagogic interventions and thus take decisions consistent with the actual circumstances of first-year students in each degree program, and, in turn, plan more effective interventions. In addition, it would be important to know the extent to which the students attribute the possible changes in their level of development of the affective dimension to the actions of the institution, and which ones in particular. For this reason, it is recommended that this line of research be followed up.

### Conclusion

The questionnaire developed is valid and reliable for use with university students to evaluate the affective dimension of the generic competencies.

In relation to its application among 194 students and the hypotheses proposed, H1 is accepted: The students possess an adequate level of development of the affective dimension of the generic competencies; and H4: The level of development of the affective dimension of the generic competencies is greater in students who have advanced to the professional cycle. H2 is rejected: The level of development of the affective dimension is similar in men and women, with a greater level of development noticed in women than in men; and H3: The level of development of the affective dimension of the generic competencies is greater in students of degrees in the Social-Humanist area, with a greater level of development of the dimension observed in students in the chemistry-biology area.

It is recommended that this questionnaire be used with a larger and more representative sample of the university population, and it should take into account the variable for exposure to the educational model by use of the treatment group and comparison group. Also, considering that valid instruments for the measuring of the cognitive and behavioral dimension of the same competencies are now available (Navarro, González, Pérez, & Varas, 2016), the conditions are in place to advance research in this area, additionally establishing the relationship between the levels of development of the cognitive, affective, and behavioral dimensions of the generic competencies. In addition, it is proposed that future lines of research be to identify the factors that influence greater or lesser development of the affective dimension of the generic competencies and to identify existing factors that are mediators of the effect of participation in an educational model for their strengthening and/or development.

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